



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,603	01/12/2004	Srinath Hosur	TI-36366	9552
23494 7590 01/25/2007 TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			EXAMINER REGO, DOMINIC E	
			ART UNIT	PAPER NUMBER
			2618	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/755,603	<b>Applicant(s)</b> HOSUR ET AL.	
	<b>Examiner</b> Dominic E. Rego	<b>Art Unit</b> 2618	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3,7-11,15, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Suh et al. (US Patent Application Publication #2004/0136464).

**Regarding claims 1,** Suh teaches a time-switched preamble generator for use with a multiple-input, multiple-output (MIMO) transmitter employing first and second transmit antennas (Figure 5, first and second transmit antennas are 527 and 539), comprising:

an initial preamble formatter configured to provide a first preamble to said first transmit antenna (*Claim 7, Suh teaches generating a first preamble sequence in which odd data of the preamble sequence becomes null data and even data of the preamble sequence becomes data, the first preamble sequence being adapted to be transmitted via the first of the two antennas for one OFDM symbol period*) and a second preamble to said second transmit antenna during an initial time interval (*Claim 7, Suh teaches generating a second preamble sequence in which the even data of the preamble sequence becomes null data and the odd data of the preamble sequence becomes*

*data, the second preamble sequence being adapted to be transmitted via the second of the two antennas for the one OFDM symbol period); and*

a subsequent preamble formatter coupled to said initial preamble formatter and configured to provide said second preamble to said first transmit antenna (*Claim 7, Suh teaches generating the first preamble sequence in which odd data of the preamble sequence becomes null data and even data of the preamble sequence becomes data, the first preamble sequence being adapted to be transmitted via the second of the two antennas for a next OFDM symbol period after passage of the one OFDM symbol period*) and said first preamble to said second transmit antenna during a subsequent time interval (*Claim 7, Suh teaches generating the second preamble sequence in which the even data of the preamble sequence becomes null data and the odd data of the preamble sequence becomes data, the second preamble sequence being adapted to be transmitted via the first of the two antennas for the next OFDM symbol period*).

**Regarding claim 2,** Suh teaches the generator wherein said first preamble employs a training sequence and said second preamble employs a null (*Claim 7*).

**Regarding claim 3,** Suh teaches the generator wherein said training sequence occurs during said null (*Claim 7, Suh teaches generating a first preamble sequence in which odd data of the preamble sequence becomes null data*).

**Regarding claim 7,** Sue teaches the generator wherein at least one of said first and second preambles employs a guard interval (Paragraphs 0010, 0013, 0078, and 0087).

Art Unit: 2618

**Regarding claim 8**, Sue teaches the generator wherein said initial and subsequent time intervals are contiguous (Claim 7).

Claims 9-16 are rejected for the same reason as set forth in claims 1-8 and claim 18-24 are rejected for the same reason as set forth in claims 2-8.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suh et al. (US Patent Application Publication #2004/0136464) in view of Nakao et al. (US Patent Application Publication #2002/0057750).

**Regarding claim 4**, Suh teaches the generator wherein said null is selected from the group consisting of: a null sequence; a zero function (Paragraphs 0037 and 0078), except for an un-modulated transmission.

However, in related art, Nakao teaches the generator wherein said null is selected from the group consisting of: an un-modulated transmission (Paragraph 0011).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the teaching of the generator wherein said null is selected from the group consisting of: an un-modulated transmission, as taught by

Art Unit: 2618

Nakao, in the Suh device for the synchronism processor 8 is capable of detecting a synchronism timing by detecting the level of NULL symbols (Nakao, Paragraph 0011).

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh et al. (US Patent Application Publication #2004/0136464) in view of Li et al. (US Patent #7,110,350).

**Regarding claim 5**, Suh teaches all the claimed elements in claim 1, except for the generator wherein said first preamble employs a first training sequence and said second preamble employs a second training sequence orthogonal to said first training sequence.

However, in related art, Li teaches the generator wherein said first preamble employs a first training sequence and said second preamble employs a second training sequence orthogonal to said first training sequence (See claim 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the teaching of the generator wherein said first preamble employs a first training sequence and said second preamble employs a second training sequence orthogonal to said first training sequence, as taught by Li, in the Suh device in order to achieve higher data transmission rates for wireless communication systems over multipath-rich wireless channels (Li, Col 1, lines 55-59).

**Regarding claim 6**, the combination of Suh and Li teach all the claimed elements in claim 5. In addition, Li teaches the generator wherein said first training sequence employs a subset of tones and said second training sequence employs a remaining subset of tones (Col 5, lines 18-38).

**Regarding claim 17**, Suh teaches a multiple-input, multiple-output (MIMO) communication system, comprising:

first and second transmitters employing first and second transmit antennas, respectively (Figure 5, first and second transmit antennas are 527 and 539);

a time-switched preamble generator coupled to said first and second transmitters, including:

an initial preamble formatter that provides a first preamble to said first transmit antenna (*Claim 7, Suh teaches generating a first preamble sequence in which odd data of the preamble sequence becomes null data and even data of the preamble sequence becomes data, the first preamble sequence being adapted to be transmitted via the first of the two antennas for one OFDM symbol period*) and a second preamble to said second transmit antenna during an initial time interval (*Claim 7, Suh teaches generating a second preamble sequence in which the even data of the preamble sequence becomes null data and the odd data of the preamble sequence becomes data, the second preamble sequence being adapted to be transmitted via the second of the two antennas for the one OFDM symbol period*), and

a subsequent preamble formatter coupled to said initial preamble formatter that provides said second preamble to said first transmit antenna (*Claim 7, Suh teaches generating the first preamble sequence in which odd data of the preamble sequence becomes null data and even data of the preamble sequence becomes data, the first preamble sequence being adapted to be transmitted via the second of the two antennas for a next OFDM symbol period after passage of the one OFDM symbol period*) and

Art Unit: 2618

said first preamble to said second transmit antenna during a subsequent time interval (*Claim 7, Suh teaches generating the second preamble sequence in which the even data of the preamble sequence becomes null data and the odd data of the preamble sequence becomes data, the second preamble sequence being adapted to be transmitted via the first of the two antennas for the next OFDM symbol period*), except for first and second receivers, associated with said first and second transmitters, that employ first and second receive antennas, respectively.

However, in related art Li teaches first and second receivers, associated with said first and second transmitters, that employ first and second receive antennas, respectively (Col 4, lines 11-25 and Figure 1, elements 140 and 150).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the teaching of first and second receivers, associated with said first and second transmitters, that employ first and second receive antennas, respectively, as taught by Li, in the Suh device in order to transmit and receive signal.

### **Conclusion**

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nakao (US Patent Application Publication #2004/0235511) teaches radio base apparatus, transmission power control method and transmission power control program.

Moorti et al. (US Patent Application Publication #2005/0111449) teaches high data throughput wireless local area network receiver.



Art Unit: 2618

Kiyanagii et al. (US Patent Application Publication #2005/0190848) teaches OFDM transceiver apparatus.

Ylitalo et al. (US Patent #6,788,661) teaches adaptive beam-time coding method and apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dominic E. Rego whose telephone number is 571-272-8132. The examiner can normally be reached on Monday-Friday, 8:30 am-5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 571-272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Dominic E. Rego



1/20/08

PHILIP J. SOBUTKA  
PATENT EXAMINER